IN THE CLAIMS

Claims 1-23. (Canceled)

24. (Previously Presented) A method comprising: forming a transition metal oxide having a phase therein which exhibits a superconducting state at a critical temperature greater than or equal to 26^{o}K,

maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase,

passing an electrical supercurrent through said transition metal oxide while it is in said superconducting state, and

said composition comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

25. (Original) The method of claim 24, where said transition metal oxide is comprised of a transition metal capable of exhibiting multivalent states.

26. (Original) The method of claim 24, where said transition metal oxide is comprised of a Cu oxide.

Claims 27-85. (Canceled)

86. (Previously Presented) A method, comprising:

forming a composition including a transition metal, a rare earth or rare earth-like element, an alkaline earth element, and oxygen, where said composition is a mixed transition metal oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than $26^{o}K$,

maintaining said composition in said superconducting state at a temperature greater than or equal to $26^{o}K$, and

passing an electrical current through said composition while said composition is in said superconducting state.

87. (Original) The method of claim 86, where said transition metal is copper.

88. (Previously Presented) A method comprising:

forming a composition exhibiting a superconductive state at a temperature in excess of $26^{o}K$, maintaining said composition at a temperature greater than or equal to $26^{o}K$ at which temperature said composition exhibits said superconductive state,

passing an electrical current through said composition while said composition is in said superconductive state, and

said composition comprising a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

89. (Previously Presented) The method of claim 88, where said composition is comprised of a copper oxide.

90. (Original) The metal of claim 88, where said composition is comprised of a transition metal oxide.

Claims 91-95. (Canceled)

96. (Previously Presented) A superconductive method for causing electric current flow in a superconductive state at a temperature greater than or equal to 26 K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprising a compound having a layer-type perovskite-like crystal structure, the composition having a superconductor transition temperature T_c of greater than 26 K;

(b) maintaining the superconductor element at a temperature greater than or equal to 26 K and below the superconductor transition temperature T_c of the superconductive composition;

(c) causing an electric current to flow in the superconductor element and

(d) said composition comprising a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

97. (Previously Presented) The superconductive method according to claim 96 in which the compound of the superconductive composition comprises at least one rare-earth or rare-earth-like element and at least one alkaline-earth element.

98. (Previously Presented) The superconductive method according to claim 97 in which the rare-earth or rare-earth-like element is lanthanum.

99. (Previously Presented) The superconductive method according to claim 97 in which the alkaline-earth element is barium.

100. (Previously Presented) The superconductive method according to claim 96 in which the compound of the superconductive composition includes mixed valent transition metal ions.

101. (Previously Presented) The superconductive method according to claim 100 in which the compound comprises at least one element in a nonstoichiometric atomic proportion.

102. (Previously Presented) The superconductive method according to claim 101 in which oxygen is present in the compound in a nonstoichiometric atomic proportion.

103. (Previously Presented) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprising a layer-type perovskite-like crystal

structure, the composition comprising a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than 26 K;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

104. (Previously Presented) The superconductive method according to claim 103 in which the rare-earth or rare-earth-like element is lanthanum.

105. (Previously Presented) The superconductive method according to claim 103 in which the alkaline-earth element is barium.

106. (Previously Presented) The superconductive method according to claim 103 in which the compound of the superconductive composition includes mixed valent copper ions.

107. (Previously Presented) The superconductive method according to claim 106 in which compound is a the copper-oxide comprising at least one element in a nonstoichiometric atomic proportion.

108. (Previously Presented) The superconductive method according to claim 107 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion.

109. (Previously Presented) A method comprising:

forming copper oxide having a phase therein which exhibits a superconducting state at a critical temperature greater than or equal to 26^{o}K;
maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase;

passing an electrical supercurrent through said copper oxide while it is in said superconducting state;

said copper oxide at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

110. (Previously Presented) A method comprising:

forming a composition including copper, oxygen and an element selected from the group consisting of a Group II A element, a rare earth element, a rare-earth-like element, an alkaline earth element and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to $26^{o}K$;

maintaining said composition in said superconducting state at a temperature greater than or equal to $26^{o}K$; and

passing an electrical current through said composition while said composition is in said superconducting state.

111. (Previously Presented) A method comprising:

forming a composition exhibiting a superconductive state at a temperature greater than or equal to 26°K;

maintaining said composition at a temperature greater than or equal to 26°K at which temperature said composition exhibits said superconductive state;

passing an electrical current through said composition while said composition is in said superconductive state; and

said composition including a copper oxide and an element selected from the group consisting of Group II A element, a rare earth element a rare earth like element, an alkaline earth element and a Group III B element.

112. (Currently Amended) A superconductive method for causing electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition <u>comprising</u> a copper-oxide compound having a layer-type perovskite-like crystal structure, the composition having a superconductive transition temperature T_c of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like

element; an alkaline earth element, a Group IIA element and a Group III B element;

(b) maintaining the superconductor element at a temperature above 26°K and below the superconductor transition temperature T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

113. (Previously Presented) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprising a copper-oxide compound having a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element, an alkaline earth element , a Group IIA element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than or equal to 26°K;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=o}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

114. (Previously Presented) A method comprising:

forming copper oxide having a phase therein which exhibits a superconducting state at a critical temperature greater than or equal to $26^{o}K$;

maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase;

passing an electrical supercurrent through said copper oxide while it is in said superconducting state;

said copper oxide includes at least one element selected from the group consisting of a Group II A element a rare earth element, a rare earth like element, an alkaline earth element, a Group IIA element and a Group III B element.

115. (Previously Presented) A method comprising the steps of:

forming a composition including copper, oxygen and an element selected from the group consisting of at least one Group II A element a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to $26^{o}K$;

maintaining said composition in said superconducting state at a temperature greater than $26^{o}K$; and

passing an electrical current through said composition while said composition is in said superconducting state.

116. (Previously Presented) A method including the steps of:

forming a composition exhibiting a superconductive state at a temperature greater than or equal to $26^{o}K$;

maintaining said composition at a temperature greater than or equal to $26^{o}K$ at which temperature said composition exhibits said superconductive state;

passing an electrical current through said composition while said composition is in said superconductive state; and

said composition including a copper oxide and at least one element selected from the group consisting of Group II A, a rare earth element, a rare earth like element, and an alkaline earth element and a Group III B element.

117. (Currently Amended) A superconductive method for causing electric-current flow in a superconductive state at a temperature greater than or equal to 26^{o}K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprising~~U~~ a copper-oxide compound having a layer-type perovskite-like crystal structure, the composition having a superconductive transition temperature T_c of greater than or equal to 26^{o}K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element, and alkaline earth element and a Group III B element;

(b) maintaining the superconductor element at a temperature above 26^{o}K and below the superconductor transition temperature T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

118. (Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprises a copper-oxide compound having a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive-resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than or equal to 26^oK;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

119. (Currently Amended) A method comprising:

forming a transition metal oxide having a phase therein which exhibits a superconducting state at a critical temperature in excess of 26^{o}K;

maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase;

passing an electrical superconducting current through said transition metal oxide while it is in said superconducting state;

said transitional metal oxide includes at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element ~~elememnt~~, an alkaline earth element and a Group III B element.

120. (Currently Amended) A method comprising:

forming a composition including a transition metal, oxygen and an element selected from the group consisting of at least one Group II A element, a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element, where said composition is a mixed transitional metal oxide formed from said transition metal and said oxygen, said mixed transition metal oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26^{o}K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26^{o}K; and

passing an electrical current through said composition while said composition is in said superconducting state.

121. (Currently Amended) A method comprising:

forming a composition exhibiting a superconductive state at a temperature or equal to 26^{o}K;

maintaining said composition at a temperature greater than or equal to 26^{o}K at which temperature said composition exhibits said superconductive state;

passing an electrical current through said composition while said composition is in said superconductive state; and

said composition including a transitional metal oxide and at least one element selected from the group consisting of Group II A, a rare earth element, a rare earth ~~eath~~ like element, an alkaline earth element and a Group III B element.

122. (Previously Presented) A superconductive method for causing electric-current flow in a superconductive state at a temperature in excess of 26°K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprising a transition metal oxide compound having a layer-type perovskite-like crystal structure, the composition having a superconductive transition temperature T_c of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element;

(b) maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

123. (Previously Presented) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprising a transition metal-oxide compound

having a layer-type perovskite-like crystal structure, the transition metal-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than or equal to 26°K;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

124. (Previously Presented) A method comprising:

forming copper oxide having a phase therein which exhibits a superconducting state at a critical temperature greater than or equal to 26°K;

maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase;

passing an electrical supercurrent through said copper oxide while it is in said superconducting state;

said copper oxide includes at least one element selected from group consisting of a Group II A element, a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element.

125. (Previously Presented) A method comprising:

forming a composition comprising copper, oxygen and at least one Group II A element, at least one rare earth element or rare earth like element, at least one alkaline earth element and at least one Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to $26^{o}K$;

maintaining said composition in said superconducting state at a temperature greater than or equal to $26^{o}K$; and

passing an electrical current through said composition while said composition is in said superconducting state.

126. (Previously Presented) A method comprising:

forming a composition exhibiting a superconductive state at a temperature greater than or equal to $26^{o}K$;

maintaining said composition at a temperature in greater than of equal to $26^{o}K$ at which temperature said composition exhibits said superconductive state;

passing an electrical current through said composition while said composition is in said superconductive state; and

said composition comprising a copper oxide and at least one element selected from the group consisting of Group II A element, a rare earth element, a rare earth like element, and alkaline earth element and a Group III B element.

127. (Previously Presented) A superconductive method for causing electric-current flow in a superconductive state at a temperature greater than or equal to $26^{o}K$, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprising a copper-oxide compound having a layer-type perovskite-like crystal structure, the composition having a superconductive transition temperature T_c of greater than or equal to $26^{o}K$, said

superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element and a Group III B element;

(b) maintaining the superconductor element at a temperature greater than or equal to 26^{o}K and below the superconductor transition temperature T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

128. (Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a layer-type perovskite-like crystal structure, the copper-oxide compound comprising at least one Group II A element, at least one a rare earth element or rare earth like ~~elememnt~~ element and at least one Group III B element, the composition having a superconductive-resistive transition temperature defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than or equal to 26^{o}K;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

129. (Previously Presented) A method comprising: providing a composition having a transition temperature greater than or equal to 26°K, the composition comprising, a transition metal element capable of exhibiting multivalent states and oxygen, including at least one phase that exhibits superconductivity at temperature greater than or equal to 26°K, maintaining said composition at said temperature to exhibit said superconductivity and passing an electrical superconducting current through said composition with said phrase exhibiting said superconductivity and said superconducting transition metal oxide comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

130. (Previously Presented) A method comprising: providing a superconducting transition metal oxide having a superconductive onset temperature greater than

or equal to 26^oK, maintaining said superconducting transition metal oxide at a temperature less than said superconducting onset temperature, flowing a superconducting current therein and said superconducting transition metal oxide comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

131. (Previously Presented) A method comprising: providing a superconducting copper oxide having a superconductive onset temperature greater than or equal to 26^oK, maintaining said superconducting copper oxide at a temperature less than said superconducting onset temperature and flowing a superconducting current in said superconducting copper oxide and said superconducting copper oxide comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

132. (Currently Amended) A method comprising: providing a superconducting oxide composition having a superconductive onset temperature greater than or equal to 26^oK, maintaining said superconducting copper oxide at a temperature

less than said superconducting onset temperature and flowing a superconducting current therein, said superconducting oxide composition ~~composition~~ comprising at least one each of rare earth element or rare earth like, an alkaline earth element, and copper.

133. (Previously Presented) A method comprising: providing a superconducting copper oxide composition having a superconductive onset temperature greater than or equal to 26°K, maintaining said superconducting copper oxide at a temperature less than said superconducting onset temperature and flowing a superconducting electrical current therein, said composition comprising at least one each of a Group III B element, an alkaline earth, and copper.

134. (Previously Presented) A method comprising: flowing a superconducting electrical current in a transition metal oxide having a T_c greater than or equal to 26°K, maintaining said transition metal oxide at a temperature less than said T_c and said transition metal oxide comprises at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

135. (Previously Presented) A method comprising: flowing a superconducting current in a copper oxide having a T_c greater than or equal to 26°K and

maintaining said copper oxide at a temperature less than said T_c and said superconducting copper oxide comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

136. (Previously Presented) A method comprising the steps of:

forming a composition of the formula Ba_xLa_{x-5}, Cu_50_Y, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^oC to about 950^oC and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26^oK;

maintaining the temperature of said composition at a temperature less than said critical temperature to induce said superconducting state in said metal oxide phase; and

passing an electrical current through said composition while said metal oxide phase is in said superconducting state.

137. (Previously Presented) A method comprising flowing a superconducting electrical current in a composition of matter having a T_c greater than or equal to 26^oK, said composition comprising at least one each of a III B element, an alkaline earth, and copper oxide and maintaining said composition of matter at a temperature less than or equal to said T_c.

138. (Previously Presented) A method comprising flowing a superconducting electrical current in a composition of matter having a T_c greater than or equal to 26^oK, said composition comprising at least one each of a rare earth, alkaline earth, and copper oxide and maintaining said composition of matter at a temperature less than said T_c.

139. (Previously Presented) A method comprising: flowing a superconducting electrical current in a composition of matter having a T_c greater than or equal to 26^oK, said composition comprising at least one each of a rare earth element or rare earth like element, and copper oxide and maintaining said composition of matter at a temperature less than said T_c.

140. (Previously Presented) A method comprising: flowing a superconducting electrical current in a composition of matter having a T_c greater than or equal to 26^oK carrying, said composition comprising at least one each of a III B element, and copper oxide and maintaining said composition of matter at a temperature less than said T_c.

141. (Currently Amended) A method comprising: flowing a superconducting electrical current in a transition metal oxide comprising a T_c greater than or equal to 26^{o}K, maintaining said transition metal oxide at a temperature less than ~~said~~ said T_c and said transition metal oxide comprises at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

142. (Previously Presented) A method comprising: flowing a superconducting electrical current in a copper oxide composition of matter comprising a T_c greater than or equal to 26^{o}K, maintaining said copper oxide composition of matter at a temperature less than said T_c and said copper oxide composition comprises at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

143. (Previously Presented) A method, comprising:

forming a composition comprising a transition metal, a group IIIB element, an alkaline earth element, and oxygen, where said composition is a mixed transition

metal oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K,

maintaining said composition in said superconducting state at a temperature greater than 26°K, and

passing an electrical current through said composition while said composition is in said superconducting state.

144. (Previously Presented) The method of claim 143, where said transition metal is copper.

145. (Previously Presented) A superconductive method for causing electric current flow in a superconductive state at a temperature greater than or equal to 26 K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the composition having a superconductor transition temperature T_c of greater than or equal to 26 K and comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare

earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements;

b) maintaining the superconductor element at a temperature above 26 K and below the superconductor transition temperature T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

146. (Previously Presented) A superconductive method for causing electric current flow in a superconductive state at a temperature greater than or equal to 26 K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the composition having a superconductor transition temperature T_c of greater than or equal to_26 K;

b) maintaining the superconductor element at a temperature above 26 K and below the superconductor transition temperature T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element

(d) the copper-oxide compound of the superconductive composition includes at least one element selected from the group consisting of a rare-earth element or rare earth like element and a Group III B element and at least one alkaline-earth element.

147.(Previously Presented) The superconductive method according to claim 146 in which the rare-earth or rare-earth-like element is lanthanum.

148. (Previously Presented) The superconductive method according to claim 146 in which the alkaline-earth element is barium.

149. (Previously Presented) The superconductive method according to claim 145 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

150. (Previously Presented) The superconductive method according to claim 149 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

151. (Previously Presented) The superconductive method according to claim 150 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion.

152. (Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a rare-earth element or a ~~reare~~ rare earth like element and a Group III B element and at least one alkaline-earth element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than or equal to 26 K;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

153. (Previously Presented) The superconductive method according to claim 152 in which said at least one element is lanthanum.

154. (Previously Presented) The superconductive method according to claim 152 in which the alkaline-earth element is barium.

155. (Previously Presented) The superconductive method according to claim 152 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

156. (Previously Presented) The superconductive method according to claim 155 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

157. (Previously Presented) The superconductive method according to claim 156 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion.

158. (Currently Amended) A superconductive method for causing electric-current flow

in a superconductive state at a temperature greater than or equal to $26^{o}K$, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the composition having a superconductive transition temperature T_c of greater than or equal to $26^{o}K$, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element, an alkaline earth ~~eleemnt~~ element and a Group III B element;

(b) maintaining the superconductor element at a temperature above $26^{o}K$ and below the superconductor transition temperature T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

159. (Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition comprising a copper-oxide compound having a

substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare ~~arth~~ earth like element, an alkaline earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than or equal to 26^oK;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=o}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

160. (Previously Presented) A superconductive method for causing electric-current flow in a superconductive state at a temperature greater than or equal to 26^oK, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the

composition having a superconductive transition temperature T_c of greater than or equal to 26^oK, said superconductive composition includes at least one Group II A element and at least one element selected from the group consisting of a rare earth element, a rare earth like element and a Group III B element;

(b) maintaining the superconductor element at a temperature above 26^oK and below the superconductor transition temperature T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

161. (Previously Presented) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element or a rare earth like element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive-resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined

by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than or equal to 26°K;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

162. (Currently Amended) A superconductive method for causing electric-current flow in a superconductive state at a temperature in excess of 26°K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a transition metal oxide compound having a substantially layered perovskite crystal structure, the composition having a superconductive transition temperature T_c of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element, a ~~rre~~ rare earth like element, an alkaline ~~arth~~ earth element and a Group III B element;

(b) maintaining the superconductor element at a temperature above 26°K and below the superconductor transition T_c of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

163. (Previously Presented) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a transition metal-oxide compound having a substantially layered perovskite crystal structure, the transition metal-oxide compound including at least one element selected from each of Group II A element, a rare earth element or rare earth like element, an alkaline earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T_c and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$, the transition-onset temperature T_c being greater than or equal to 26^{o}K;

(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature $T_{p=0}$ of the superconductive composition; and

(c) causing an electric current to flow in the superconductor

element.

164. (Previously Presented) A method according to claim 129 wherein said composition comprises a substantially layered perovskite crystal structure.

165. (Previously Presented) A method according to claim 130 wherein said superconducting transistor metal oxide comprises a substantially layered perovskite crystal structure.

166. (Previously Presented) A method according to claim 131 wherein said superconducting copper oxide comprises a substantially layered perovskite crystal structure.

167. (Previously Presented) A method according to claim 132 wherein said superconducting oxide composition comprises a substantially layered perovskite crystal structure.

168. (Previously Presented) A method according to claim 133 wherein said superconducting oxide composition comprises a substantially layered perovskite crystal structure.

169. (Previously Presented) A method according to claim 134 wherein said transistor metal oxide comprises a substantially layered perovskite crystal structure.

170. (Previously Presented) A method according to claim 135 wherein said copper oxide comprises a substantially layered perovskite crystal structure.

171. (Previously Presented) A method according to claim 136 wherein said composition comprises a substantially layered perovskite crystal structure.

172. (Previously Presented) A method according to claim 137 wherein said composition of matter comprises a substantially layered perovskite crystal structure.

173. (Previously Presented) A method according to claim 138 wherein said composition of matter comprises substantially layered perovskite crystal structure.

174. (Previously Presented) A method according to claim 139 wherein said composition of matter comprises a substantially layered perovskite crystal structure.

175. (Previously Presented) A method according to claim 140 wherein said composition of matter comprises substantially layered perovskite crystal structure.

176. (Previously Presented) A method according to claim 141 wherein said transistor metal oxide comprises substantially layered perovskite crystal structure.

177. (Previously Presented) A method according to claim 142 wherein said copper oxide composition comprises substantially layered perovskite crystal structure.

178. (Previously Presented) An method comprising:

providing a composition comprising a transition metal, oxygen and any element selected from the group consisting of a Group II A element, a rare earth element or a rare earth like element and a Group III B element, where said composition is a mixed transition metal oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

passing an electrical current through said composition while said composition is in said superconducting state.

179. (Previously Presented) An method comprising:

providing a composition comprising a transition metal, oxygen and (1) a rare earth element or a rare earth-like element or a group III B element, and/or (2) an alkaline earth element or a Group IIA element, where said composition exhibits a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

passing an electrical current through said composition while said composition is in said superconducting state.

180. (Previously Presented) A method according to claim 178 wherein said transition metal is copper.

181. (Previously Presented) A method according to claim 179 wherein said transition metal is copper.

182. (Previously Presented) A method comprising:

flowing a superconducting current through a material comprising a T_c greater than or equal to 26°K,

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

183. (Currently Amended) A method according to claim 182 further including maintaining said material at a temperature less than or equal ~~to said~~ to said T_C <u>and greater than or equal to 26^{o}K</u>.

184. (Previously Presented) A method according to claim 182 further including providing a source of current for said superconducting current.

185. (Previously Presented) A method according to claim 183 further including providing a source of current for said superconducting current.

186. (Previously Presented) A method according to claim 182 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^{o}K.

187. (Previously Presented) A method according to claim 183 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^{o}K.

188. (Previously Presented) A method according to claim 184 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^{o}K.

189. (Previously Presented) A method according to claim 185 wherein said material is maintained at a temperature less than equal to said T_C and greater than or equal to 26^{o}K.

190. (Previously Presented) A method according to claim 182 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

191. (Previously Presented) A method according to claim 183 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,
a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^oC to about 950^oC and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^oC to about 950^oC and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

192. (Previously Presented) A method according to claim 184 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing

said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

193. (Previously Presented) A method according to claim 185 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,
a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth,
rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

194. (Previously Presented) A structure according to claim 186 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

195. (Previously Presented) A method according to claim 187 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

196. (Previously Presented) A method according to claim 188 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

197. (Previously Presented) A method according to claim 189 said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,
a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

198. (Previously Presented) A method according to claim 182, wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

199. (Currently Amended) A method according to claim 182 wherein said rare earth-like elements include elements ~~include elements~~ comprising ~~a rare earth characteristic~~ property which makes it essentially a rare earth element.

200. (Previously Presented) A method according to claim 182 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

201. (Previously Presented) A method according to claim 182 wherein said composition comprises one or more of one or more of of Be, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

202. (Previously Presented) A method according to claim 182 wherein said material can be made according to known principles of ceramic science.

203. (Previously Presented) A method according to claim 182 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

204. (Previously Presented) A method according to claim 182 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

205. (Previously Presented) A method according to claim 182 wherein said material comprises a multiphase material wherein at least one phase exhibits superconductivity.

206. (Previously Presented) A method according to claim 182 wherein said method is a method of operation of a structure capable of magnetic levitation.

207. (Previously Presented) A method according to claim 182 wherein said material comprises at least one element selected from each of said first element group and said second element group.

208. (Currently Amended) A method according to any one of claims 182 to 206 or 207 wherein said superconducting current is flowing in a structure selected from the group consisting of:

a power generation device,
an electrical power transmission device,
an electrical power transmission element,
a coil,
a magnet,
a plasma device,
a nuclear device,
a nuclear magnetic ~~resonace~~ resonance device,
a nuclear magnetic imaging device,
a magnetic levitation device,
a power ~~gerneation~~ generation system,
a thermonuclear fusion device,
a switching device,
a Josephson junction device,
an electrical packaging device,
a circuit device,
a electronic instrumentation device,
a train,
a magnetic ~~suceptomoter~~ susceptometer, and
a magnetometer.

209. (Currently Amended) A method according to any one of claims 182 to 207~~or 208~~ wherein said superconducting current is flowing in a coil comprised of said material.

210. (Previously Presented) A method according to claim 209 wherein said material possesses substantially zero electrical resistance.

211. (Previously Presented) A method according to claim 209 wherein said coil possesses substantially zero electrical resistance.

212. (Previously Presented) A method according to claim 182 where in said superconducting current is flowing in a structure selected from the group consisting of a device, an apparatus, a circuit and a combination.

213. (Currently Amended) A method according to any one of claims 182 to 207 ~~211~~or 212 wherein said material possesses substantially zero electrical resistance.

214. (Currently Amended) A method according to any one of claims 182 to 207~~or 208~~ wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance~~.~~ between said input and said output.

215. (Previously Presented) A method according to claim 214 wherein said material possesses substantially zero electrical resistance.

216. (Currently Amended) A method according to any one of claims 182 to 207~~or 208~~ wherein said superconducting current flows from an input of a circuit element to an output of said circuit element.

217. (Previously Presented) A method according to claim 216 wherein said material possesses substantially zero electrical resistance.

218. (Currently Amended) A method according to any one of claims 182 to 207 ~~211or 212~~ wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

219. (Previously Presented) A method according to claim 218 wherein said material possesses substantially zero electrical resistance.

220. (Currently Amended) A method according to any one of claims 182 to 207~~or 208~~ wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

221. (Previously Presented) A method according to claim 220 wherein said material possesses substantially zero electrical resistance.

222. (Previously Presented) A method according to claim 216 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

223. (Previously Presented) A method according to claim 222 wherein said material possesses substantially zero electrical resistance.

224. (Currently Amended) A method according to any one of claims 182 to 207 ~~or 208~~ wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

225. (Previously Presented) A method according to claim 224 wherein said material possesses substantially zero electrical resistance.

226. (Previously Presented) A method according to claim 209 wherein said coil is carrying said superconducting current flowing therein without a source providing for said superconducting current.

227. (Currently Amended) A structure according to any one of claims 182 to 207 ~~or 208~~ wherein said superconducting current is flowing without a source providing for said superconducting current.

228. (Previously Presented) A method comprising:

flowing a superconducting current through a material having a T_c greater than or equal to 26^oK~~;~~

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

229. (Previously Presented) A method comprising:

flowing a superconducting current through a material with a T_c greater than or equal to 26^oK~~;~~

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and group IIA elements.

230. (Previously Presented) A method comprising:

flowing a superconducting current through a material possessing a T_c greater than or equal to 26^oK;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

231. (Currently Amended) A method according to any one of claims 182, 228, 229 or 230 wherein said rare earth-like elements ~~include elements~~ include elements comprising a ~~rare earth characteristic~~ <u>property which makes it essentially a rare earth element</u>.

232. (Currently Amended) A method according to any one of claims 182 to 207 ~~212~~, 228, 229 or 230 further including forming said material.

233. (Previously Presented) A method according to claim 213 further including forming said material.

234. (Previously Presented) A method according to claim 214 further including forming said material.

235. (Previously Presented) A method according to claim 215 further including forming said material.

236. (Previously Presented) A method according to claim 216 further including forming said material.

237. (Previously Presented) A method according to claim 217 further including forming said material.

238. (Previously Presented) A method according to claim 218 further including forming said material.

239. (Previously Presented) A method according to claim 219 further including forming said material.

240. (Previously Presented) A method according to claim 220 further including forming said material.

241. (Previously Presented) A method according to claim 221 further including forming said material.

242. (Previously Presented) A method according to claim 222 further including forming said material.

243. (Previously Presented) A method according to claim 223 further including forming said material.

244. (Previously Presented) A method according to claim 224 further including forming said material.

245. (Previously Presented) A method according to claim 225 further including forming said material.

246. (Previously Presented) A method according to claim 226 further including forming said material.

247. (Previously Presented) A method according to claim 227 further including forming said material.

248. (Previously Presented) A method according to claim 231 further including forming said material.

249. (Currently Amended) A method according to any one of claims 182 to <u>207</u> ~~212~~, 228, 229 or 230 further including providing said material.

250. (Previously Presented) A method according to claim 213 further including providing said material.

251. (Previously Presented) A method according to claim 214 further including providing said material.

252. (Previously Presented) A method according to claim 215 further including providing said material.

253. (Previously Presented) A method according to claim 216 further including providing said material.

254. (Previously Presented) A method according to claim 217 further including providing said material.

255. (Previously Presented) A method according to claim 218 further including providing said material.

256. (Previously Presented) A method according to claim 219 further including providing said material.

257. (Previously Presented) A method according to claim 220 further including providing said material.

258. (Previously Presented) A method according to claim 221 further including providing said material.

259. (Previously Presented) A method according to claim 222 further including providing said material.

260. (Previously Presented) A method according to claim 223 further including providing said material.

261. (Previously Presented) A method according to claim 224 further including providing said material.

262. (Previously Presented) A method according to claim 225 further including providing said material.

263. (Previously Presented) A method according to claim 226 further including providing said material.

264. (Previously Presented) A method according to claim 227 further including providing said material.

265. (Previously Presented) A method according to claim 231 further including providing said material.

266. (Previously Presented) A method according to any one of claims 182, 228, 229 or 230 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

267. (Previously Presented) A method according to any one of claims 182, 228, 229 or 230 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

268. (Currently Amended) An method comprising:

maintaining a composition in a superconducting state at a temperature greater than or equal to 26°K;

said composition ~~posseses~~ possesses an electrical current passing through said composition while said composition is in said superconducting state; and

said composition comprising a transition metal, oxygen and any element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, where said composition is a mixed copper oxide having a

non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K.

269. (Currently Amended) An method comprising:

maintaining a composition in a superconducting state at a temperature greater than or equal to 26°K;

said composition ~~posseses~~ possesses an electrical current passing through said composition while said composition is in said superconducting state; and

said composition comprising a transition metal, oxygen and (1) a rare earth element or a rare earth-like element or a group III B element, and/or (2) an alkaline earth element or a Group IIA element, where said composition exhibits a superconducting state at a temperature greater than or equal to 26°K.

270. (Previously Presented) A method according to claim 268 wherein said transition metal is copper.

271. (Previously Presented) A method according to claim 269 wherein said transition metal is copper.

272. (Currently Amended) A method comprising:

applying ~~the~~ a magnetic field ~~or the~~ to cause substantially zero resistance to the flow of electrical current of a material comprising a superconducting current flowing therein, said material comprising a T_c greater than or equal to 26^oK;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

273. (Currently Amended) A method according to claim 272 further including maintaining said material at a temperature less than or equal to said ~~to said~~ T_C <u>and greater than or equal to 26°K</u>.

274. (Previously Presented) A method according to claim 272 further including providing a source of current for said superconducting current.

275. (Previously Presented) A method according to claim 273 further including providing a source of current for said superconducting current.

276. (Previously Presented) A method according to claim 272 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26°K.

277. (Previously Presented) A method according to claim 273 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26°K.

278. (Previously Presented) A method according to claim 274 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26°K.

279. (Previously Presented) A method according to claim 275 wherein said material is maintained at a temperature less than equal to said T_C and greater than or equal to 26^oK.

280. (Previously Presented) A method according to claim 272 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and

for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

281. (Previously Presented) A method according to claim 273 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,
a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

282. (Previously Presented) A method according to claim 274 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

283. (Previously Presented) A method according to claim 275 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth,

rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

284. (Previously Presented) A structure according to claim 276 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

285. (Previously Presented) A method according to claim 277 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,
a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

286. (Previously Presented) A method according to claim 278 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

287. (Previously Presented) A method according to claim 279 said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,
a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

288. (Previously Presented) A method according to claim 272, wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

289. (Currently Amended) A method according to claim 272 wherein said rare earth-like elements ~~include elements~~ include elements comprising a ~~rare earth characteristic~~ property which makes it essentially a rare earth element.

290. (Previously Presented) A method according to claim 272 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

291. (Currently Amended) A method according to claim 272 wherein said composition comprises one or more of one or more of ~~of~~ Be, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

292. (Previously Presented) A method according to claim 272 wherein said material can be made according to known principles of ceramic science.

293. (Previously Presented) A method according to claim 272 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

294. (Previously Presented) A method according to claim 272 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

295. (Previously Presented) A method according to claim 272 wherein said material comprises a multiphase material wherein at least one phase exhibits superconductivity.

296. (Previously Presented) A method according to claim 272 wherein said method is a method of operation of a structure capable of magnetic levitation.

297. (Previously Presented) A method according to claim 272 wherein said material comprises at least one element selected from each of said first element group and said second element group.

298. (Currently Amended) A method according to any one of claims 272 to 296 or 297 wherein said superconducting current is flowing in a structure selected from the group consisting of:

a power generation device,
an electrical power transmission device,
an electrical power transmission element,
a coil,
a magnet,
a plasma device,
a nuclear device,
a nuclear magnetic ~~resonace~~ resonance device,
a nuclear magnetic imaging device,
a magnetic levitation device,
a power ~~gerneation~~ generation system,
a thermonuclear fusion device,
a switching device,
a Josephson junction device,
an electrical packaging device,
a circuit device,
a electronic instrumentation device,
a train,
a magnetic ~~suceptometer~~ susceptometer, and
a magnetometer.

299. (Currently Amended) A method according to any one of claims 272 to 297 ~~or 298~~ wherein said superconducting current is flowing in a coil comprised of said material.

300. (Previously Presented) A method according to claim 299 wherein said material possesses substantially zero electrical resistance.

301. (Previously Presented) A method according to claim 299 wherein said coil possesses substantially zero electrical resistance.

302. (Previously Presented) A method according to claim 272 where in said superconducting current is flowing in a structure selected from the group consisting of a device, an apparatus, a circuit and a combination.

303. (Currently Amended) A method according to any one of claims 272 to 297 ~~301 or 302~~ wherein said material possesses substantially zero electrical resistance.

304. (Currently Amended) A method according to any one of claims 272 to 297 ~~301 or 302~~ wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance~~.~~ between said input and said output.

305. (Previously Presented) A method according to claim 304 wherein said material possesses substantially zero electrical resistance.

306. (Previously Presented) A method according to any one of claims 272 to 280 or 281 wherein said superconducting current flows from an input of a circuit element to an output of said circuit element.

307. (Previously Presented) A method according to claim 306 wherein said material possesses substantially zero electrical resistance.

308. (Currently Amended) A method according to any one of claims 272 to 297 ~~301 or 302~~ wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

309. (Previously Presented) A method according to claim 308 wherein said material possesses substantially zero electrical resistance.

310. (Currently Amended) A method according to claim 272 to 297 ~~or 298~~ wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

311. (Previously Presented) A method according to claim 300 wherein said material possesses substantially zero electrical resistance.

312. (Previously Presented) A method according to claim 306 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

313. (Previously Presented) A method according to claim 312 wherein said material possesses substantially zero electrical resistance.

314. (Currently Amended) A method according to any one of claims 272 to 297 ~~or 298~~ wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

315. (Previously Presented) A method according to claim 314 wherein said material possesses substantially zero electrical resistance.

316. (Previously Presented) A method according to claim 299 wherein said coil is carrying said superconducting current flowing therein without a source providing for said superconducting current.

317. (Currently Amended) A method according to any one of claims 272 to 297 ~~or 298~~ wherein said superconducting current is flowing without a source providing for said superconducting current.

318. (Currently Amended) A method comprising:

applying ~~the~~ a magnetic field ~~or the~~ to cause substantially zero resistance to the flow of electrical current of a material comprising a superconducting current flowing therein, said material having a T_c greater than or equal to 26^oK;

said superconductive property is selected from the group consisting of the magnetic field caused by said superconducting current, the substantially zero resistance to the flow of said superconducting current and combinations thereof;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

319. (Currently Amended) A method comprising:

applying ~~the~~ a magnetic field ~~or the~~ to cause substantially zero resistance to the flow of electrical current of a material comprising a superconducting current flowing therein, said material with a T_c greater than or equal to 26^oK;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

320. (Currently Amended) A method comprising:

applying ~~the~~ a magnetic field ~~or the~~ to cause substantially zero resistance to the flow of electrical current of a material comprising a superconducting current flowing therein, said material possessing a T_c greater than or equal to 26^oK;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

321. (Currently Amended) A method according to any one of claims 272, 319 or 320 wherein said rare earth-like elements include elements comprising ~~include elements comprising a rare earth characteristic~~ a property which makes it essentially a rare earth element.

322. (Previously Presented) A method according to any one of claims 272 to 301 or 302 further including forming said material .

323. (Previously Presented) A method according to claim 303 further including forming said material.

324. (Previously Presented) A method according to claim 304 further including forming said material.

325. (Previously Presented) A method according to claim 305 further including forming said material.

326. (Previously Presented) A method according to claim 306 further including forming said material.

327. (Previously Presented) A method according to claim 307 further including forming said material.

328. (Previously Presented) A method according to claim 308 further including forming said material.

329. (Previously Presented) A method according to claim 309 further including forming said material.

330. (Previously Presented) A method according to claim 310 further including forming said material.

331. (Previously Presented) A method according to claim 311 further including forming said material.

332. (Previously Presented) A method according to claim 312 further including forming said material.

333. (Previously Presented) A method according to claim 313 further including forming said material.

334. (Previously Presented) A method according to claim 314 further including forming said material.

335. (Previously Presented) A method according to claim 315 further including forming said material.

336. (Previously Presented) A method according to claim 316 further including forming said material.

337. (Previously Presented) A method according to claim 317 further including forming said material.

338. (Previously Presented) A method according to claim 318 further including forming said material.

339. (Currently Amended) A method according to any one of claims 272 to 297 ~~301 or 302~~ further including providing said material .

340. (Previously Presented) A method according to claim 303 further including providing said material.

341. (Previously Presented) A method according to claim 304 further including providing said material.

342. (Previously Presented) A method according to claim 305 further including providing said material.

343. (Previously Presented) A method according to claim 306 further including providing said material.

344. (Previously Presented) A method according to claim 307 further including providing said material.

345. (Previously Presented) A method according to claim 308 further including providing said material.

346. (Previously Presented) A method according to claim 309 further including providing said material.

347. (Previously Presented) A method according to claim 310 further including providing said material.

348. (Previously Presented) A method according to claim 311 further including providing said material.

349 (Previously Presented) A method according to claim 312 further including providing said material.

350 (Previously Presented) A method according to claim 313 further including providing said material.

351. (Previously Presented) A method according to claim 314 further including providing said material.

352. (Previously Presented) A method according to claim 315 further including providing said material.

353. (Previously Presented) A method according to claim 316 further including providing said material.

354. (Previously Presented) A method according to claim 317 further including providing said material.

355 (Previously Presented) A method according to claim 318 further including providing said material.

356. (Currently Amended) An method comprising:

providing a composition comprising a transition metal, oxygen and any element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

wherein said composition ~~posseses~~ possesses an electrical current passing through said composition while said composition is in said superconducting state.

357. (Currently Amended) An method comprising:

providing a composition comprising a transition metal, oxygen and (1) a rare earth element or a rare earth-like element or a group III B element, and/or (2) an alkaline earth element or a Group IIA element, where said composition exhibits a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

wherein said composition ~~posseses~~ possesses an electrical current passing through said composition while said composition is in said superconducting state.

358. (Previously Presented) A method according to claim 356 wherein said transition metal is copper.

359. (Previously Presented) A method according to claim 357 wherein said transition metal is copper.

360. (Previously Presented) A method comprising:

providing a material, said material possesses a superconducting current flowing therein, said material comprising a T_c greater than or equal to 26^oK~~;~~

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

361. (Currently Amended) A method according to claim 360 further including maintaining said material at a temperature less than or equal to said ~~to said~~ T_C and greater than or equal to 26^{o}K.

362. (Previously Presented) A method according to claim 360 further including providing a source of current for said superconducting current.

363. (Previously Presented) A method according to claim 361 further including providing a source of current for said superconducting current.

364. (Previously Presented) A method according to claim 360 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^{o}K.

365. (Previously Presented) A method according to claim 361 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^{o}K.

366. (Previously Presented) A method according to claim 362 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^{o}K.

367. (Previously Presented) A method according to claim 363 wherein said material is maintained at a temperature less than equal to said T_C and greater than or equal to 26^{o}K.

368. (Previously Presented) A method according to claim 360 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

369. (Previously Presented) A method according to claim 361 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,
a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and

for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

370. (Previously Presented) A method according to claim 362 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

371. (Previously Presented) A method according to claim 363 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,
a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth,
rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

372. (Previously Presented) A structure according to claim 364 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

373. (Previously Presented) A method according to claim 365 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

374. (Previously Presented) A method according to claim 366 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

375. (Previously Presented) A method according to claim 367 said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,
a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

376. (Previously Presented) A method according to claim 360 wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

377. (Currently Amended) A method according to claim 360 wherein said rare earth-like elements include elements comprising a ~~rare earth characteristic~~ property which makes it essentially a rare earth element.

378. (Previously Presented) A method according to claim 360 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

379. (Previously Presented) A method according to claim 360 wherein said composition comprises one or more of one or more of of Be, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

380. (Previously Presented) A method according to claim 360 wherein said material can be made according to known principles of ceramic science.

381. (Previously Presented) A method according to claim 360 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

382. (Previously Presented) A method according to claim 360 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

383. (Previously Presented) A method according to claim 360 wherein said material comprises a multiphase material wherein at least one phase exhibits superconductivity.

384. (Previously Presented) A method according to claim 360 wherein said method is a method of operation of a structure selected from the group consisting of an apparatus, a device, a circuit and a combination.

385. (Previously Presented) A method according to claim 360 wherein said material comprises at least one element selected from each of said first element group and said second element group.

386. (Previously Presented) A method according to any one of claims 360 to 384 or 385 wherein said superconducting current is flowing in a structure selected from the group consisting of:

a power generation device,
an electrical power transmission device,
an electrical power transmission element,
a coil,
a magnet,
a plasma device,
a nuclear device,
a nuclear magnetic resonace device,
a nuclear magnetic imaging device,
a magnetic levitation device,
a power gerneation system,
a thermonuclear fusion device,
a switching device,
a Josephson junction device,
an electrical packaging device,
a circuit device,
a electronic instrumentation device,
a train,
a magnetic suceptomoter, and

a magnetometer.

387. (Currently Amended) A method according to any one of claims 360 to 385 ~~or 386~~ wherein said superconducting current is flowing in a coil comprised of said material.

388. (Previously Presented) A method according to claim 387 wherein said material possesses substantially zero electrical resistance.

389. (Previously Presented) A method according to claim 387 wherein said coil possesses substantially zero electrical resistance.

390. (Previously Presented) A method according to claim 360 where in said superconducting current is flowing in a structure selected from the group consisting of a device, an apparatus, a circuit and a combination.

391. (Currently Amended) A method according to any one of claims 360 to 385 ~~389~~ or 390 wherein said material possesses substantially zero electrical resistance.

392. (Currently Amended) A method according to any one of claims 360 to 385 ~~or 386~~ wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance. between said input and said output.

393. (Previously Presented) A method according to claim 392 wherein said material possesses substantially zero electrical resistance.

394. (Previously Presented) A method according to any one of claims 360 to 368 or 369 wherein said superconducting current flows from an input of a circuit element to an output of said circuit element.

395. (Previously Presented) A method according to claim 394 wherein said material possesses substantially zero electrical resistance.

396. (Currently Amended) A method according to any one of claims 360 to 385 ~~389~~ or 390 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

397. (Previously Presented) A method according to claim 396 wherein said material possesses substantially zero electrical resistance.

398. (Currently Amended) A method according to any one of claims 360 to 385 ~~or 386~~ wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

399. (Previously Presented) A method according to claim 388 wherein said material possesses substantially zero electrical resistance.

400. (Previously Presented) A method according to claim 394 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

401. (Previously Presented) A method according to claim 400 wherein said material possesses substantially zero electrical resistance.

402. (Currently Amended) A method according to any one of claims 360 to 385 ~~or 386~~ wherein said material is part of a circuit element, said circuit element is

capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

403. (Previously Presented) A method according to claim 402 wherein said material possesses substantially zero electrical resistance.

404. (Previously Presented) A method according to claim 387 wherein said coil is carrying said superconducting current flowing therein without a source providing for said superconducting current.

405. (Currently Amended) A method according to any one of claims 360 to 385 ~~or 386~~ wherein said superconducting current is flowing without a source providing for said superconducting current.

406. (Previously Presented) A method comprising:

providing a material, said material possesses a superconducting current flowing therein, said material having a T_c greater than or equal to 26^oK;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

407. (Previously Presented) A method comprising:

providing a material, said material possesses a superconducting current flowing therein, said material with a T_c greater than or equal to 26^oK;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

408. (Currently Amended) A method comprising:

providing a material, said material ~~posseses~~ possesses a superconducting current flowing therein, said material possessing a T_c greater than or equal to 26^oK;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

409. (Currently Amended) A method according to any one of claims 360, 406, 407 or 408 wherein said rare earth-like elements include elements comprising a ~~rare earth characteristic~~ property which makes it essentially a rare earth element.

410. (Currently Amended) A method according to any one of claims 360 to 385 ~~390~~ or ~~391~~ 390 further including forming said material.

411. (Previously Presented) A method according to claim 391 further including forming said material.

412. (Previously Presented) A method according to claim 392 further including forming said material.

413. (Previously Presented) A method according to claim 393 further including forming said material.

414. (Previously Presented) A method according to claim 394 further including forming said material.

415. (Previously Presented) A method according to claim 395 further including forming said material.

416. (Previously Presented) A method according to claim 396 further including forming said material.

417. (Previously Presented) A method according to claim 397 further including forming said material.

418. (Previously Presented) A method according to claim 398 further including forming said material.

419. (Previously Presented) A method according to claim 399 further including forming said material.

420. (Previously Presented) A method according to claim 400 further including forming said material.

421. (Previously Presented) A method according to claim 401 further including forming said material.

422. (Previously Presented) A method according to claim 402 further including forming said material.

423. (Previously Presented) A method according to claim 403 further including forming said material.

424. (Previously Presented) A method according to claim 404 further including forming said material.

425. (Previously Presented) A method according to claim 405 further including forming said material.

426. (Previously Presented) A method according to claim 406 further including forming said material.

427. (Previously Presented) A method according to any one of claims 272, 318, 319, 320, 360, 406, 407, or 408 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

428. (Previously Presented) A method according to any one of claims 272, 318, 319, 320, 360, 406, 407, or 408 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

429. (Previously Presented) An method comprising:

providing a structure comprising a composition comprising a transition metal, oxygen and any element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

an electrical current passing through said composition while said composition is in said superconducting state.

430. (Previously Presented) An method comprising:

providing a structure comprising a composition comprising a transition metal, oxygen and (1) a rare earth element or a rare earth-like element or a group III B element, and/or (2) an alkaline earth element or a Group IIA element, where said composition exhibits a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

an electrical current passing through said composition while said composition is in said superconducting state.

431. (Previously Presented) A method according to claim 429 wherein said transition metal is copper.

432. (Previously Presented) A method according to claim 430 wherein said transition metal is copper.

433. (Previously Presented) A method comprising:

providing a structure selected from the group consisting of a device, a circuit and an apparatus, said structure comprising a material comprising a T_c greater than or equal to $26^{o}K$~~;~~

said material comprises a property selected from the group consisting of being capable of carrying a superconducting current and exhibiting a substantially zero resistance to the flow of electrical current therethrough when in a superconducting state;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

434. (Previously Presented) A method according to claim 433 further including providing a source of cooling said material at a temperature less than or equal to said to said T_C.

435. (Previously Presented) A method according to claim 433 further including providing a source of current for said superconducting current.

436. (Previously Presented) A method according to claim 434 further including providing a source of current for said superconducting current.

437. (Previously Presented) A method according to claim 433 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^oK.

438. (Previously Presented) A method according to claim 434 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^oK.

439. (Previously Presented) A method according to claim 435 wherein said material is maintained at a temperature less than or equal to said T_C and greater than or equal to 26^oK.

440. (Previously Presented) A method according to claim 436 wherein said material is maintained at a temperature less than equal to said T_C and greater than or equal to 26^oK.

441. (Previously Presented) A method according to claim 433 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

.

442. (Previously Presented) A method according to claim 434 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,
a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having

a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

443. (Previously Presented) A method according to claim 435 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

444. (Previously Presented) A method according to claim 436 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth,

rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^oC to about 950^oC and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^oC to about 950^oC and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

445. (Previously Presented) A structure according to claim 437 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

446. (Previously Presented) A method according to claim 438 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,
a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

447. (Previously Presented) A method according to claim 439 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540^{o}C to about 950^{o}C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

448. (Previously Presented) A method according to claim 440 said material comprises at least one phase which comprises a property selected from the group consisting of:

a layered structure,

a layered crystalline structure,

a substantially layered structure,

a substantially layered crystalline structure,

a layered-like structure,

a layered-type structure,

a layered characteristic,

a layered perovskite structure,

a layered perovskite crystal structure,

a substantially layered perovskite structure,

a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombic-tetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element , alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu^{3+} ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu^{3+} ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu^{2+} and Cu^{3+} ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,
a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula $Ba_xLa_{x-5}Cu_5O_Y$ wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula $BaLa_{5-x}Cu_5O_{5(3-y)}$, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

449. (Previously Presented) A method according to claim 433 wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

450. (Currently Amended) A method according to claim 433 wherein said rare earth-like elements include elements comprising a ~~rare earth characteristic~~ property which makes it essentially a rare earth element.

451. (Previously Presented) A method according to claim 433 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

452. (Previously Presented) A method according to claim 433 wherein said composition comprises one or more of one or more of of Be, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

453. (Previously Presented) A method according to claim 433 wherein said material can be made according to known principles of ceramic science.

454. (Previously Presented) A method according to claim 433 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

455. (Previously Presented) A method according to claim 433 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

456. (Previously Presented) A method according to claim 433 wherein said material comprises a multiphase material wherein at least one phase exhibits superconductivity.

457. (Previously Presented) A method according to claim 433 wherein said method is a method of operation of a capable of magnetic levitation.

458. (Previously Presented) A method according to claim 433 wherein said material comprises at least one element selected from each of said first element group and said second element group.

459. (Previously Presented) A method according to any one of claims 433 to 457 or 458 wherein said superconducting current is capable of flowing in a structure selected from the group consisting of:

a power generation device,
an electrical power transmission device,
an electrical power transmission element,
a coil,
a magnet,
a plasma device,
a nuclear device,
a nuclear magnetic resonace device,
a nuclear magnetic imaging device,
a magnetic levitation device,
a power gerneation system,
a thermonuclear fusion device,
a switching device,
a Josephson junction device,
an electrical packaging device,
a circuit device,
a electronic instrumentation device,
a train
a magnetic suceptomoter, and
a magnetometer.

460. (Currently Amended) A method according to any one of claims 433 to 458 ~~or 459~~ wherein said superconducting current is capable of flowing in a coil comprised of said material.

461. (Previously Presented) A method according to claim 460 wherein said material possesses substantially zero electrical resistance.

462. (Previously Presented) A method according to claim 460 wherein said coil possesses substantially zero electrical resistance.

463. (Previously Presented) A method according to claim 433 where in said superconducting current is capable of flowing in a structure selected from the group consisting of a device, an apparatus, a circuit and a combination.

464. (Currently Amended) A method according to any one of claims 433 to 458 ~~462~~ or 463 wherein said material possesses substantially zero electrical resistance.

465. (Currently Amended) A method according to any one of claims 433 to 458 ~~or 459~~ wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance~~.~~ between said input and said output.

466. (Previously Presented) A method according to claim 465 wherein said material possesses substantially zero electrical resistance.

467. (Previously Presented) A method according to any one of claims 433 to 441 or 442 wherein said superconducting is capable of flowing from an input of a circuit element to an output of said circuit element.

468. (Previously Presented) A method according to claim 467 wherein said material possesses substantially zero electrical resistance.

469. (Currently Amended) A method according to any one of claims 433 to 458 ~~462~~ or 463 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

470. (Previously Presented) A method according to claim 469 wherein said material possesses substantially zero electrical resistance.

471. (Currently Amended) A method according to any one of claims 433 to 458 ~~or 459~~ wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

472. (Previously Presented) A method according to claim 461 wherein said material possesses substantially zero electrical resistance.

473. (Previously Presented) A method according to claim 467 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

474. (Previously Presented) A method according to claim 473 wherein said material possesses substantially zero electrical resistance.

475. (Currently Amended) A method according to any one of claims 433 to 458 ~~or 459~~ wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

476. (Previously Presented) A method according to claim 475 wherein said material possesses substantially zero electrical resistance.

477. (Previously Presented) A method according to claim 460 wherein said coil is capable of carrying said superconducting current flowing therein without a source providing for said superconducting current.

478. (Currently Amended) A method according to any one of claims 433 to 458 ~~or 459~~ wherein said superconducting current is capable of flowing without a source providing for said superconducting current.

479. (Previously Presented) A method comprising:

providing a structure selected from the group consisting of a device, a circuit and an apparatus, said structure comprising a material having a T_c greater than or equal to 26^oK~~;~~

said material comprises a property selected from the group consisting of being capable of carrying a superconducting current and exhibiting a substantially zero resistance to the flow of electrical current therethrough when in a superconducting state;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

480. (Previously Presented) A method comprising:

providing a structure selected from the group consisting of a device, a circuit and an apparatus, said structure comprising a material with a T_c greater than or equal to 26^oK;

said material comprises a property selected from the group consisting of being capable of carrying a superconducting current and exhibiting a substantially zero resistance to the flow of electrical current therethrough when in a superconducting state;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

481. (Previously Presented) A method comprising:

providing a structure comprising a material possessing a T_c greater than or equal to 26^oK~~;~~

said material comprises a property selected from the group consisting of being capable of carrying a superconducting current and exhibiting a substantially zero resistance to the flow of electrical current therethrough when in a superconducting state;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

482. (Currently Amended) A method according to any one of claims 433, 479, 480 or 481 wherein said rare earth-like elements include elements comprising a ~~rare earth characteristic~~ property which makes it essentially a rare earth element.

483. (Previously Presented) A method according to any one of 433, 479, 480 or 481 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

484. (Previously Presented) A method according to any one of claims 433, 479, 480 or 481 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains in a coil of said material.

485. (Currently Amended) A method according to any one of claims 433, 479, 480 or 481 wherein said method comprises a method of fabricating said structure ~~is~~ in a manufacturing method.

486. (New) A method according to claim 208 wherein said superconducting current is flowing in a coil comprised of said material.

487. (New) A method according to claim 486 wherein said material possesses substantially zero electrical resistance.

488. (New) A method according to claim 486 wherein said coil possesses substantially zero electrical resistance.

489. (New) A method according to claim 208 wherein said material possesses substantially zero electrical resistance.

490. (New) A method according to claim 209 wherein said material possesses substantially zero electrical resistance.

491. (New) A method according to claim 210 wherein said material possesses substantially zero electrical resistance.

492. (New) A method according to claim 211 wherein said material possesses substantially zero electrical resistance.

493. (New) A method according to claim 212 wherein said material possesses substantially zero electrical resistance.

494. (New) A method according to claim 208 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance between said input and said output.

495. (New) A method according to claim 494 wherein said material possesses substantially zero electrical resistance.

496. (New) A method according to claim 208 wherein said superconducting current flows from an input of a circuit element to an output of said circuit element.

497. (New) A method according to claim 493 wherein said material possesses substantially zero electrical resistance.

498. (New) A method according claim 208 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

499. (New) A method according claim 209 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

500. (New) A method according claim 210 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

501. (New) A method according claim 211 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

502. (New) A method according claim 212 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

503. (New) A method according to claim 498 wherein said material possesses substantially zero electrical resistance.

504. (New) A method according to claim 499 wherein said material possesses substantially zero electrical resistance.

505. (New) A method according to claim 500 wherein said material possesses substantially zero electrical resistance.

506. (New) A method according to claim 501 wherein said material possesses substantially zero electrical resistance.

507. (New) A method according to claim 502 wherein said material possesses substantially zero electrical resistance.

508. (New) A method according to claim 208 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

509. (New) A method according to claim 508 wherein said material possesses substantially zero electrical resistance.

510. (New) A method according to claim 496 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

511. (New) A method according to claim 510 wherein said material possesses substantially zero electrical resistance.

512. (New) A method according to claim 208 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

513. (New) A method according to claim 512 wherein said material possesses substantially zero electrical resistance.

514. (New) A structure according to claim 208 wherein said superconducting current is flowing without a source providing for said superconducting current.

515. (New) A method according to claim 208 further including forming said material.

516. (New) A method according to claim 209 further including forming said material.

517. (New) A method according to claim 210 further including forming said material.

518. (New) A method according to claim 211 further including forming said material.

519. (New) A method according to claim 212 further including forming said material.

520. (New) A method according to claim 208 further including providing said material.

521. (New) A method according to claim 209 further including providing said material.

522. (New) A method according to claim 210 further including providing said material.

523. (New) A method according to claim 211 further including providing said material.

524. (New) A method according to claim 212 further including providing said material.

525. (New) A method according to claim 298 wherein said superconducting current is flowing in a coil comprised of said material.

526. (New) A method according to claim 525 wherein said material possesses substantially zero electrical resistance.

527. (New) A method according to claim 525 wherein said coil possesses substantially zero electrical resistance.

528. (New) A method according to 298 wherein said material possesses substantially zero electrical resistance.

529. (New) A method according to 299 wherein said material possesses substantially zero electrical resistance.

530. (New) A method according to 300 wherein said material possesses substantially zero electrical resistance.

531. (New) A method according to 301 wherein said material possesses substantially zero electrical resistance.

532. (New) A method according to 302 wherein said material possesses substantially zero electrical resistance.

533. (New) A method according to claim 298 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance~~.~~ between said input and said output.

534. (New) A method according to claim 299 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance~~.~~ between said input and said output.

535. (New) A method according to claim 300 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance~~.~~ between said input and said output.

536. (New) A method according to claim 301 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance~~.~~ between said input and said output.

537. (New) A method according to claim 302 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance~~.~~ between said input and said output.

538. (New) A method according to claim 533 wherein said material possesses substantially zero electrical resistance.

539. (New) A method according to claim 534 wherein said material possesses substantially zero electrical resistance.

540. (New) A method according to claim 535 wherein said material possesses substantially zero electrical resistance.

541. (New) A method according to claim 536 wherein said material possesses substantially zero electrical resistance.

542. (New) A method according to claim 537 wherein said material possesses substantially zero electrical resistance.

543. (New) A method according to claim 298 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

544. (New) A method according to claim 299 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

545. (New) A method according to claim 300 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

546. (New) A method according to claim 301 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

547. (New) A method according to claim 302 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

548. (New) A method according to claim 543 wherein said material possesses substantially zero electrical resistance.

549. (New) A method according to claim 544 wherein said material possesses substantially zero electrical resistance.

550. (New) A method according to claim 545 wherein said material possesses substantially zero electrical resistance.

551. (New) A method according to claim 546 wherein said material possesses substantially zero electrical resistance.
552. (New) A method according to claim 547 wherein said material possesses substantially zero electrical resistance.

553. (New) A method according to claim 298 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

554. (New) A method according to claim 298 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

555. (New) A method according to claim 554 wherein said material possesses substantially zero electrical resistance.

556. (New) A method according to claim 298 wherein said superconducting current is flowing without a source providing for said superconducting current.

557. (New) A method according to any claim 298 further including providing said material.

558. (New) A method according to any claim 299 further including providing said material.

559. (New) A method according to any claim 300 further including providing said material.

560. (New) A method according to any claim 301 further including providing said material.

561. (New) A method according to any claim 302 further including providing said material.
562. (New) A method according to claim 386 wherein said superconducting current is flowing in a coil comprised of said material.

563. (New) A method according to claim 562 wherein said material possesses substantially zero electrical resistance.

564. (New) A method according to claim 562 wherein said coil possesses substantially zero electrical resistance.

567. (New) A method according to claim 386 wherein said material possesses substantially zero electrical resistance.

568. (New) A method according to claim 387 wherein said material possesses substantially zero electrical resistance.

569. (New) A method according to claim 388 wherein said material possesses substantially zero electrical resistance.

570. (New) A method according to claim 389 wherein said material possesses substantially zero electrical resistance.

571. (New) A method according to claim 386 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance. between said input and said output.

572. (New) A method according to claim 571 wherein said material possesses substantially zero electrical resistance.

573. (New) A method according claim 386 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

574. (New) A method according claim 387 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

575. (New) A method according claim 388 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

576. (New) A method according claim 389 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

577. (New) A method according to claim 386 wherein said material possesses substantially zero electrical resistance.

578. (New) A method according to claim 387 wherein said material possesses substantially zero electrical resistance.

579. (New) A method according to claim 388 wherein said material possesses substantially zero electrical resistance.

580. (New) A method according to claim 389 wherein said material possesses substantially zero electrical resistance.

581. (New) A method according to claim 386 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

582. (New) A method according to claim 386 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

583. (New) A method according to claim 582 wherein said material possesses substantially zero electrical resistance.

584. (New) A method according to claim 386 wherein said superconducting current is flowing without a source providing for said superconducting current.

585. (New) A method according to claim 386 further including forming said material.

586. (New) A method according to claim 387 further including forming said material.

587. (New) A method according to claim 388 further including forming said material.

588. (New) A method according to claim 389 further including forming said material.

589. (New) A method according to claim 391 further including forming said material.

590. (New) A method according to claim 459 wherein said superconducting current is capable of flowing in a coil comprised of said material.

591. (New) A method according to claim 590 wherein said material possesses substantially zero electrical resistance.

592. (New) A method according to claim 590 wherein said coil possesses substantially zero electrical resistance.

593. (New) A method according to claim 459 wherein said material possesses substantially zero electrical resistance.

594. (New) A method according to claim 460 wherein said material possesses substantially zero electrical resistance.

595. (New) A method according to claim 461 wherein said material possesses substantially zero electrical resistance.

596. (New) A method according to claim 462 wherein said material possesses substantially zero electrical resistance.

597. (New) A method according to claim 459 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance between said input and said output.

598. (New) A method according to claim 597 wherein said material possesses substantially zero electrical resistance.

599. (New) A method according to claim 459 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

600. (New) A method according to claim 460 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

601. (New) A method according to claim 461 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

602. (New) A method according to claim 462 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

603. (New) A method according to claim 459 wherein said material possesses substantially zero electrical resistance.

604. (New) A method according to claim 460 wherein said material possesses substantially zero electrical resistance.

605. (New) A method according to claim 461 wherein said material possesses substantially zero electrical resistance.

606. (New) A method according to claim 462 wherein said material possesses substantially zero electrical resistance.

607. (New) A method according to claim 459 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

608. (New) A method according to claim 459 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

609. (New) A method according to claim 475 wherein said material possesses substantially zero electrical resistance.

610. (New) A method according to claim 459 wherein said superconducting current is capable of flowing without a source providing for said superconducting current.